

### REMARKS/ARGUMENTS

Favorable reconsideration of this application is requested in view of the above amendments and in light of the following remarks and discussion.

Claims 1-16, 21-27, and 36-46 are pending. Claims 1, 4, 8, 10, 13, 21, and 22 are amended. Claims 17-20 and 28-35 are canceled. Claims 36-46 are newly added.

In the outstanding Office Action, Claims 21-23, 25, and 27 were rejected under 35 U.S.C. § 102(b) as anticipated by Watanabe et al. (Japanese Patent No. 06204143, herein "Watanabe"). Claims 1-5, 8-16, 34, and 35 were rejected under 35 U.S.C. § 103(a) as obvious over Watanabe in view of Moslehi (U.S. Patent No. 5,846,883, herein "Moslehi"). Claims 17-20 and 26 were rejected under 35 U.S.C. § 103(a) as obvious over Watanabe in view of Tanaka et al. (U.S. Patent Pub. 2004/0020599, herein "Tanaka"). Claim 24 was rejected under 35 U.S.C. § 103(a) as obvious over Watanabe. Claims 6 and 7 were rejected under 35 U.S.C. § 103(a) as obvious over Watanabe, Moslehi, and Kawada et al. (U.S. Patent No. 5,536,395, herein "Kawada").

Regarding the rejection of Claims 1-5, 8-16, 34, and 35 as obvious over Watanabe in view of Moslehi, that rejection is respectfully traversed by the present response.

Claims 1 and 10

By way of review, the shower head structure and the semiconductor processing device in accordance with the inventions recited in amended independent Claims 1 and 10 includes a shower head and a plurality of gas injection holes for providing one or more gases. The structure includes **at least one light introducing rod of a radiation thermometer inserted through at least one of the gas injection holes. Additionally, at least one of the gases is supplied to the processing space through said at least one of the gas injection holes through which said at least one light introducing rod is inserted.** Support for these

features can be found, for example, in the specification on page 16, line 7 – page 17, line 11; page 18, line 8 – page 19, line 10; and Figs. 1-4).

One benefit of this arrangement is the prevention or reduction of film from adhering to the light introducing rod (see page 19, line 23-24 of the specification).

The outstanding Office Action asserts that Watanabe discloses a shower head including a plurality of gas injection holes and a radiation thermometer, and that Moslehi discloses an optical plug (604) inserted through a shower head.

However, in both Watanabe and Moslehi, there is no suggestion that it would be preferable to insert the light introducing rod through the gas injection hole of the shower head. Moreover, Watanabe and Moslehi both fail to disclose that **a gas is supplied to the processing space through a gas injection hole through which a light introducing rod is inserted.**

Moreover, in accordance with the inventions recited in amended independent Claims 1 and 10, by **inserting the light introducing rod through the gas injection hole of the shower head**, a film is prevented from adhering to the light introducing rod by **the gas injected from said one of the gas injection holes through which the light introducing rod is inserted.** Accordingly, the wafer temperature can be detected accurately. However, both Watanabe and Moslehi fail to suggest the above-mentioned structure or technical benefits of the inventions recited in amended independent Claims 1 and 10.

Thus, it is respectfully submitted that amended independent Claims 1 and 10 and the claims depending therefrom patentably distinguish over any proper combination of Watanabe and Moslehi.

Applicants wish to make the following additional remarks regarding the rejection of dependent Claim 5. In accordance with the invention recited in Claim 5, an opening area of a gas injection hole through which each of said at least one light introducing rod is inserted is

larger than an opening area of a gas injection hole through which no light introducing rod is inserted **by a cross sectional area of said at least one light introducing rod**, an identical gas being injected through the gas injection hole and said another gas injection hole.

However, Watanabe and Moslehi do not suggest the above-noted limitation of Claim 5. On page 12, the outstanding Office Action points to Fig. 1 of Watanabe for the above-noted feature. Neither Fig. 6 nor anywhere else in Watanabe suggests **a spatial relationship between an opening area through which a light rod is inserted and another gas injection hole**. Indeed, when one reference, Moslehi, is cited for a light introducing rod, and a second reference, Watanabe is cited for a showerhead with gas injection holes, any proper combination of Watanabe and Moslehi would be devoid of the particular spatial relationship between the light introducing rod and the area of the injection hole recited in dependent Claim 5.

Applicants wish to make the following comments on newly added dependent Claims 36, 38, 39 and 41. In accordance with the inventions recited in Claims 36, 38, 39, and 41, gases include a first gas and a second gas different from the first gas, the gas injection holes include first gas injection holes and second gas injection holes through which the first and the second gas are respectively introduced into the processing space, and each of said at least one of the gas injection holes is included in the first gas injection holes. Claim 38 recites that the first gas is an assist gas, and the second gas is a processing gas. However, both Watanabe and Moslehi fail to disclose that the gas injection holes are inserted only through the first gas injection holes through which the assist gas is introduced into the processing space.

Regarding the rejection of independent Claim 21 as anticipated by Watanabe, that rejection is respectfully traversed by the present response.

Independent Claim 21 and newly added dependent Claims 42-45 are directed to a semiconductor processing device including a processing chamber forming the processing

space, a shower head, a heat ray introducing passage, a radiation thermometer, and a gas introducing passage formed through the shower head. The shower head having a plurality of gas injection holes and a space formed therein provides the processing gas to the gas injection holes through the space formed therein. The gas introducing passage **is formed inside the shower head**, connected to the heat ray introducing passage to introduce an additional gas thereinto. Additionally, the gas introducing passage **is separated from the space formed inside the shower head** and the additional gas is introduced into the processing space through the heat ray introducing passage. **The heat ray introducing passage is separated from the space formed inside the shower head** such that **the additional gas and the processing gas are supplied to the processing space from the shower head without being mixed**. A gas species constituting the additional gas is different from that of the processing gas. **The radiation thermometer is attached to the shower head.**

The above-noted features are supported by page 16, line 26 - page 17, line 2; and page 40, line 3 – page 43, line 24 of the specification. The above-noted features reduce or prevent formation on measurement window (116) of an unwanted film that disturbs the temperature measurement (see page 41 line 15-22 and page 42 line 20-25).

The outstanding Office Action asserts that "volume inside 6" of Watanabe corresponds to the heat ray introducing passage, "volume between top and bottom of 14" of Watanabe corresponds to the shower head, and "16/17" of Watanabe corresponds to the gas introducing passage.

In accordance with the invention recited in amended independent Claim 21, the gas introducing passage is formed inside the shower head, and the heat ray introducing passage is formed through the shower head. However, according to Watanabe, "16/17" is not inside the "volume between top and bottom of 14", and "volume inside 6" is not formed through "volume between top and bottom of 14". Therefore, Watanabe fails to disclose the gas

introducing passage formed inside the shower head and the heat ray introducing passage formed through the shower head as recited in amended independent Claim 21.

Further, as recited in Claim 42, the gas introducing passage is connected to the heat ray introducing passage to introduce an additional gas thereinto, and the additional gas introduced to the heat ray introducing passage flows to the processing space. Additionally, the heat ray introducing passage is separated from the space formed inside the shower head such that **the additional gas and the processing gas are supplied to the processing space from the shower head without being mixed**. As recited in Claim 41, **the additional gas and the processing gas are different**.

However, according to Watanabe, since an additional gas introduced into "volume inside 6" from "16/17" flows to processing space, the additional gas has to pass through the space formed in the "volume between top and bottom of 14", and the additional gas may be mixed with a processing gas in the space formed in the "volume between top and bottom of 14". Accordingly, since the additional gas of Watanabe cannot be different from the processing gas, Watanabe fails to disclose that **the additional gas and the processing gas are different** and that **the heat ray introducing passage is separated from the space formed inside the shower head such that the additional gas and the processing gas are supplied to the processing space from the shower head without being mixed**.

Further, since between the radiation thermometer of Watanabe and the shower head of Watanabe the heat ray introducing passage of Watanabe is displaced, Watanabe fails to disclose that the radiation thermometer is attached to the shower head.

Therefore, it is respectfully submitted that independent Claim 21 and Claims 42-45 patentably distinguish over the cited references.

Regarding the rejection of Claim 26 as obvious over Watanabe in view of Tanaka, Claim 26 depends from independent Claim 21 and patentably distinguishes over Watanabe for at least the same reasons as discussed above regarding independent Claim 21.

The outstanding Office Action relies on Tanaka for the feature of an isolation ring. Tanaka fails to remedy the deficiencies discussed above regarding Watanabe and independent Claim 21. Rather, Tanaka does not teach or suggest a heat ray introducing passage vertically formed through the shower head and separated from the space formed inside the shower head as recited in independent Claim 1. Accordingly, Applicants respectfully submit that dependent Claim 26 patentably distinguishes over any proper combination of Watanabe and Tanaka for at least the reasons discussed above.

Regarding the rejection of Claim 24 as obvious over Watanabe, Applicants respectfully submit that Claim 24 depends from independent Claim 21 and patentably distinguishes over Watanabe for at least the same reasons as independent Claim 21 does.

Regarding the rejection of Claims 6 and 7 as obvious over Watanabe in view of Moslehi and Kawada, that rejection is respectfully traversed by the present response.

Claims 6 and 7 depend from independent Claim 1 and patentably distinguish over any proper combination of Watanabe and Moslehi for at least the same reasons as independent Claim 1 does.

Kawada fails to remedy the deficiencies discussed above regarding Moslehi. The outstanding Office Action asserts that Kawada teaches a retractable radiation transmission rod.<sup>1</sup> However, Kawada does not teach or suggest a light introducing rod for a thermometer inserted through at least one of a plurality of gas injection holes in a shower head. Accordingly, no proper combination of Watanabe, Moslehi, and Kawada would include all of the features recited in either of dependent Claims 6 and 7.

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<sup>1</sup> Outstanding Office Action, page 19.

Newly added dependent Claim 46 recites that **the at least one light introducing rod does not contact an inner peripheral wall of the at least one gas injection hole through which the at least one light introducing rod is inserted.**

The outstanding Office Action acknowledges that Watanabe does not teach at least one light introducing rod and relies on Mosley for the above-noted feature. Specifically, the outstanding Office Action points to the optical sensor port (604) shown in Fig. 22 of Mosley for the feature of a light transmitting rod.<sup>2</sup> However, as shown in Fig. 22 of Mosley, the optical sensor port (604) is in contact with the walls of the stainless steel vacuum plate (603) through which the optical sensor port (604) is inserted. Additionally, the optical sensor port (604) is in contact with the bonded ceramic ICP housing (601) through which the optical sensor port is inserted. Accordingly, Applicants respectfully submit that no proper combination of Watanabe and Mosley would include all of the features recited in newly added dependent Claim 46. Support for the features of newly added dependent Claim 46 can be found in Figs. 1 and 2, for example. No new matter is added.

For the foregoing reasons, it is respectfully submitted that this application is now in condition for allowance. A Notice of Allowance for Claims 1-16, 21-27, and 36-46 is earnestly solicited.

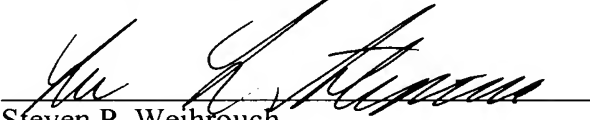
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<sup>2</sup> Outstanding Office Action, page 13.

Should Examiner Zervigon deem that any further action is necessary to place this application in even better form for allowance, he is encouraged to contact Applicants' undersigned representative at the below-listed telephone number.

Respectfully submitted,

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